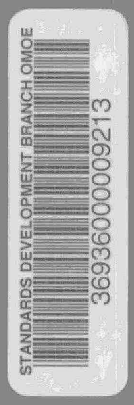

WATER POLLUTION SURVEY OF THE VILLAGE OF BEETON

1973

Ministry of the Environment

Ontario

MINISTRY OF THE ENVIRONMENT

WATER POLLUTION SURVEY

OF

THE VILLAGE OF BEETON

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TABLE OF CONTENTS

INTRODUCTION

A follow-up water pollution survey was made in the Village of Beeton in July, 1972 to re-assess the water pollution control facilities and water quality conditions of surface waters within the Village. As a result of this survey, the Simcoe County Health Unit along with the Private Waste & Water Management Branch of the Ministry of the Environment conducted a sanitary survey in Beeton to locate premises not connected to the sanitary sewer system and also to locate sewage discharges to ditches in unserviced areas.

The initial water pollution survey was conducted in 1965 at which time it was found that sanitary wastes were gaining access to the municipal storm drainage system. Preliminary engineering studies were being made for a Provincial Sewage Works Project at that time and it was recommended that this project be expedited as soon as possible. Since then, a sewage collection system and treatment works have been installed.

I GENERAL

The Village of Beeton with a 1971 assessed population of 1,044 (1972 Municipal Directory) is centrally located in the Township of Tecumseth. The Village acts as a marketing centre for the surrounding agricultural area; also, the Township's municipal office and a senior citizens home is located within the Village. Although industry is very minimal, subdivision development is increasing and the Village has the possibility of becoming highly residential as it is within commuting distance of Metropolitan Toronto.

A municipal water works system serves the entire Village. A portion of the Village is provided with a municipal sewage works system; the remaining area utilizes septic-tank systems.

The topography of the land is relatively smooth to gently sloping within the Village itself. Soils to the north and east consist of a silty loam and to the south-west the soil is a sandy loam type. To the south, the soil is a silty clay loam. Drainage is provided by a series of storm sewers and drainage ditches which direct flow to Beeton Creek to the north. The north-east section of the Village is low-lying and is subject to a high ground water table and periodic flooding. Beeton Creek is a tributary of the Nottawasaga River.

II MUNICIPAL WATER WORKS

The municipal water supply is obtained from three sources: a spring supply and two well supplies.

The spring supply is obtained from a 270-acre spring catchment area located one mile south-east of the Village. Several springs in this area are directed by channels to a concrete catchment basin where suspended solids in the spring water are allowed to settle out. The accumulated sediment in the basin is removed in the spring and fall. The water level in the basin is controlled by a weir at the outlet. From the catchment basin, the water enters a building where the water is screened by two wire-mesh screens of 3/4-inch and 1/4-inch openings in series. From here, the water then flows through a grit channel for further

removal of fine solids. The water is then transferred north 2,500 feet towards the Village to an open reservoir via two gravity feedermains 4-inch and 6-inch in diameter, respectively.

From the reservoir the water flows by gravity through approximately 3,500 feet of 12, 10, and 8-inch diameter cast iron pipes to the chlorination building located in the south-east part of the Village. The water is chlorinated and metered prior to entry into the distribution system.

The second source of supply is the Urbanski well located within the Village limits near the intersection of Cedar and Patterson streets. The water is treated for iron and the removal of methane gas. The water is pumped by air lifting through a vent pipe which allows the removal of approximately 95 per cent of the gases. The water then enters a 100-gallon vent tank where the remaining gases are released. From the tank the water is metered and pumped to the distribution system. Chlorine and sodium silicate are added to the water after the vent tank for iron treatment. The treated water leaves the pumphouse through a 2-inch diameter pipe to a 6-inch main on Patterson Street.

Water from a second well, the McKelvey well, flows from the well under artesian conditions to a 10,000 gallon aerated reservoir. The reservoir provides the retention time necessary for the methane gas to escape from the water. Water is prechlorinated in the reservoir to prevent the growth of taste and odour producing bacteria. From the reservoir, the water is pumped through a Manganese Greensand filter for iron removal and then post chlorinated prior to delivery to the distribution system.

Preliminary aquifer tests for the McKlevey well have shown a yield of 500 gpm. The water works plant itself was constructed to accommodate treatment units which would produce up to 200 gpm. The initial treatment capacity is 50 IGPM.

A. Water Supply Capacities

The spring catchment area has a yield of 85,000 GPD (59 GPM) during dry summer flow. The capacity of the reservoir is 240,000 gallons. The Urbanski and McKelvey wells are each rated at 50 gpm for a total pumping capacity of 144,000 gpd. Therefore, the municipal water supply has a capacity of 229,000 gpd (159 gpm).

B. Water Consumption

In 1971, a total of 37.7 million gallons was consumed at an average daily usage of 103,248 GPD; with the entire population (1,044) being served an average daily per capita water consumption of 99 gallons is indicated. A maximum day usage of 153,200 gallons occurred in the month of June, thereby giving a maximum daily per capita consumption of 147 gallons.

For 1972, the average daily water consumption was 104,200 GPD serving a population of 1,084. This represents an average daily per capita consumption of 96 GPD. A maximum day usage of 163,700 GPD occurred in October, thereby giving a maximum per capita consumption of 151 gallons. There are 410 units served by the municipal system.

Using the maximum per capita consumption figure of 151, the water works system has a capacity to serve a population of 1,520.

III MUNICIPAL WATER POLLUTION CONTROL FACILITIES

A. Municipal

The municipal sewage works system, built in 1968 and consisting of a sewage collection system, a sewage pumping station and forcemain, and a 14.8-acre two-celled lagoon system was Provincially-financed; the pumping station, forcemain and lagoon are owned and operated by the Ministry of the Environment.

There are about three miles of 8-and 10-inch diameter gravity collector sewers which direct domestic wastes to the pumping station at Yonge and Centre streets. From there, the sewage is pumped to the 6.8 and 8.0-acre lagoon cells. The 14.8-acre lagoon was designed to serve a population of 1,400 at 100 gpcd on a seaonsal retention basis. At this design flow, a retention period of 132 days is provided.

The sanitary sewer system was installed to serve 84 per cent of the built-up area including all of the business area on Main Street, two public schools (360 students), Simcoe Manor in Tecumseth Township (112 persons), and most of the residential area. Of the 275 possible sewer connections in the village, sanitary sewers were made available to approximately 231. However, there have been only 156 sewer connections made so far serving 581 persons including Simcoe Manor. The actual Village population served by the sewer system is 469 or about 45 per cent of the population (1971).

In 1971, a total of 18,248,000 gallons of raw sewage was pumped to the lagoon. As there were 581 persons connected to the system, a per capita sewage flow of 86.1 gpcd is represented.

A total of 22,049,000 gallons was pumped to the lagoon system in 1972. Taking into account that there has been a slight increase in population, a per capita sewage flow of 100 gpcd would be representative.

At the time of the survey, the 6.8 acre cell was full and an overflow to the second cell was occurring. There has been no lagoon effluent to date to the watercourse.

B. Future

Due to the rapid increase in subdivision proposals for the Village, Council has requested the approval for an expansion of the Provincial Sewage Works Project. In this way, lot levies from approved subdivisions can be used to assist in financing the municipal water works system.

As there was some speculation that seepage was occurring in the lagoon cells, infiltration studies and monitoring of ground and surface water quality were carried out to determine whether the present operation of the treatment works was satisfactory or whether expansion of the lagoon system would be required.

As a result of the studies, there did not appear to be any significant deterioration of ground and surface waters in the area. Therefore, for the interim, a connected population of 2,250 could be allowed on the existing system. However, should the lagoon cells seal beforehand, then expansion would be required.

IV SAMPLE RESULTS

A. Municipal Drainage System

Drainage for the Village is provided by a system of storm sewers and roadside ditches. Most of the drainage is directed to a municipal drainage ditch which begins at the bottom of Tecumseth Street south-west of the Village limits. This ditch travels north on the west side of Tecumseth to Prospect Street then turns east to Second Street. Here the ditch runs north under the sidewalk on Second Street and then outfalls to an open field. The ditch continues north and then east along Cedar Street. From Cedar Street west of Henry Street, the ditch runs directly north to Beeton Creek.

Laboratory results of samples collected from the municipal drainage ditch in 1965 showed considerable evidence of organic and bacteriological contamination. Domestic wastes were also visibly noticed in the ditch at Main Street.

Since the 1965 water pollution survey, a municipal sewerage works system was installed to serve a major portion of the Village to alleviate the pollution problems. However, bacteriological and chemical samples collected during the 1972 survey indicates that a pollution problem still exists.

A bacteriological and chemical sample collected from the municipal drainage ditch upstream from the main residential and business area at the south limits of the Village showed the water quality to be normal. However, downstream sampling at Main Street revealed a marked increase

in the coliform count. Also the BOD increased indicating the water in the ditch had deteriorated. The high total coliform and fecal coliform counts indicate that domestic wastes are gaining access to the ditch. Samples collected downstream at Prospect Street showed an even further deterioration of the water quality with high coliform counts and an increase in the BOD.

Bacteriological examination of samples collected on two occasions from the ditch as it emerges from the end of Second Street showed an even greater increase in the total coliform and fecal coliform counts: total - 230,000 and 450,000; fecal - 17,000 and 560. This indicates that additional domestic wastes were being discharged to the ditch. Continued sampling of the municipal drainage ditch downstream as it passes through the residential area still revealed the ditch to be completely contaminated with high total coliform and fecal coliform counts indicative of human wastes.

B. Beeton Creek

A bacteriological sample collected on July 19, 1972 from Beeton Creek upstream from the municipal drainage ditch outlet showed the water quality to be satisfactory. However, a downstream sample collected at the bridge showed an increase in the total coliform count indicating stream impairment from the discharge from the municipal drainage ditch. A previous grab sample on July 7, 1972 downstream at the bridge did not show any significant impairment indicating that drainage from the Village could be intermittently affecting the stream quality depending on runoff conditions.

All of the Creek's samples collected on July 19, 1972, downstream from the municipal drainage ditch showed bacteriological contamination. These included samples collected downstream from a cattle grazing area and also opposite and downstream from the Beeton sewage lagoons. The effect of the grazing area and the sewage lagoon on the creek water was not known at the time.

V DISCUSSION

This follow-up water pollution survey of the Village of Beeton has shown that although a municipal sewage works system was installed to eliminate the pollution problems in the municipality, there has only been a slight change in the conditions. There was no visible evidence of raw sewage in the drainage ditch; however, bacteriological examination showed the water in the ditch to be contaminated. The high coliform counts which were obtained indicated that domestic wastes of human origin were still gaining access to the storm drainage system although sanitary sewers are available in the areas where the ditch was polluted.

As indicated previously in the report only a portion of the population which could connect to the sanitary sewer system are in actual fact connected. There is no municipal by-law to enforce residents utilizing septic tank systems to connect to the sanitary sewers even though they are paying frontage and connection fees in their municipal taxes. It is suspected that some of the septic tank systems are inadequate and wastes are gaining access to the ditches. Also, direct sanitary connections to the storm drainage system could exist particularly on Second Street where the municipal drainage ditch is covered and no sanitary sewers are available.

The survey conducted by the Simcoe County Health Unit and the Private Waste and Water Management Branch using dye tests did not provide positive indication that domestic waste discharges were gaining access to the storm drainage ditch. However, they found that the results of bacteriological samples collected from the drainage ditch showed that significant contamination was still entering the storm drainage system from Main Street, Second Avenue and Centre Street.

VI SUMMARY AND CONCLUSIONS

A follow-up water pollution survey of the Village of Beeton was made on July 7 and 19, 1972, to determine if pollution conditions in the municipality had changed since the development of the Provincial sewage works project.

A sanitary survey was also conducted by the Simcoe County Health Unit and the Private Waste and Water Management Branch in early 1973.

Bacteriological examination of samples collected from the municipal drainage ditch revealed the water in the ditch to be contaminated and unsafe for body contact use. The high total and fecal coliform counts indicate that domestic sewage is still gaining access to the ditch and is intermittently impairing the water quality of Beeton Creek. Although sanitary sewers are available to most of the population, only a portion of the residents have connected to the system. It is suspected that in areas where sanitary sewers are available, there are malfunctioning septic tank systems existing with discharges to the municipal drainage ditch and also where sanitary sewers are not available, there may be direct discharges of domestic wastes to the ditch although dye testing of suspected establishements did not reveal anything positive.

Therefore, the sanitary sewer system should be extended to unserviced areas and where sanitary sewers are available connections should be made to the system.

RECOMMENDATIONS

1. The municipality should pass a bylaw to enforce connection to the sanitary sewer system.

2. The sanitary sewer system should be extended to unserviced areas.

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TABLE I

VILLAGE OF BEETON

WATER CONSUMPTION - 1972

WELL SUPPLY
(gallons)

MONTH	TOTAL	AVERAGE DAILY	MAXIMUM DAY	MINIMUM DAY
January	1,492,200	48,142	53,800	32,500
February	1,388,700	47,852	51,800	40,800
March	1,338,600	43,181	47,800	38,600
April	1,207,800	40,260	46,300	35,400
May	1,180,900	38,935	42,200	34,500
June	1,092,900	36,417	41,400	33,600
July	1,134,600	36,600	49,700	31,000
August	1,094,600	35,310	49,300	18,100
September	1,236,500	41,217	52,200	34,400
October	1,081,600	36,053	49,300	28,300
November	1,073,300	35,777	40,500	27,900
December	1,022,500	32,984	40,900	26,900

SPRING SUPPLY

January	2,138,100	68,971	96,600	27,000
February	2,062,500	71,121	92,300	54,500
March	2,287,300	73,784	86,100	51,900
April	1,826,900	60,897	94,200	44,100
May	1,650,900	53,255	76,100	24,800
June	1,669,200	55,640	95,300	31,900
July	1,736,300	56,010	83,500	39,600
August	1,672,700	53,958	80,400	40,900
September	1,574,100	52,470	74,500	38,900
October	2,754,400	88,852	117,200	47,300
November	2,233,500	74,450	108,700	57,900
December	2,187,200	70,555	93,800	50,800

TABLE I - cont'd

COMBINED CONSUMPTION

(Gallons)

MONTH	TOTAL	AVERAGE	MAXIMUM
January	3,630,500	117,113	141,061
February	3,448,200	118,903	136,032
March	3,625,900	116,965	126,800
April	3,034,700	101,157	133,100
May	2,831,800	91,348	110,880
June	2,761,700	92,057	123,284
July	2,870,900	92,610	113,200
August	2,767,300	89,268	109,015
September	2,810,600	93,687	114,600
October	3,836,000	124,905	163,700
November	3,306,800	110,227	135,800
December	3,209,700	103,539	123,540
TOTAL	38,134,100	104,192	

AVERAGE PUMPAGE	104,192 gpd
MAXIMUM DAY PUMPAGE	163,700 gpd
No. of units served	410
Per capita consumption	96 gpcd

TABLE II

VILLAGE OF BEETON

SEWAGE FLOWS - 1971
(gallons)

MONTH	TOTAL	AVERAGE DAILY FLOW
January	1,289,000	41,600
February	1,209,000	43,200
March	2,071,000	67,300
April	2,162,000	72,100
May	3,162,000	101,000
June	1,166,000	38,900
July	1,127,000	36,400
August	1,079,000	34,800
September	1,151,000	38,400
October	1,140,000	36,800
November	1,225,000	40,800
December	1,467,000	47,400
	18,248,000	49,995

1972

January	1,562,000	50,400
February	1,291,000	44,500
March	1,642,000	53,000
April	2,419,000	80,600
May	1,575,000	50,800
June	1,335,000	44,500
July	1,469,000	47,400
August	1,211,000	39,100
September	1,303,000	43,500
October	1,526,000	49,000
November	1,828,000	61,000
December	2,086,000	67,000
	22,049,000	60,000

TABLE III

SAMPLING POINT	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS TOTAL (PPM)	SOLIDS SUSP. (PPM)	SOLIDS DISS. (PPM)	MBAS AS LAS	TOTAL KJELDAHL	PHOSPHORUS AS P TOTAL	BACTERIOLOGICAL EXAMINATION TOTAL COLIFORMS	FAECAL COLIFORMS	ENTEROCOCCUS
B-3	MUNICIPAL DRAINAGE DITCH AT TECUMSETH STREET.	JULY 7/72	0.6		5		-	.27	.015	1,250	30	850
B-4	MUNICIPAL DRAINAGE DITCH AT MAIN STREET.	SEPT.15/65	82	790	50	740	-	-	-	610,000	-	-
		JULY 7/72	2.5		10		0.1	1.7	.16	11,000	660	3,300
		JULY 19/72	1.4		10		0.1	1.0	.4	40,000	27,000	14,800
B-5	MUNICIPAL DRAINAGE DITCH AT PROSPECT STREET.	JULY 7/72	3.5		10		0.6	1.1	.19	64,000	9,000	2,400
B-6	MUNICIPAL DRAINAGE DITCH AT SECOND STREET.	SEPT.15/65	96	570	45	525	-	-	-	10,800,000	-	-
		JULY 7/72	3.0		5		0.7	.88	.24	230,000	17,000	950
		JULY 19/72	7.5		20		0.8	1.0	1.3	450,000	560	360
B-7	MUNICIPAL DRAINAGE DITCH AT CENTRE & CEDAR STS.	SEPT.15/65	12	530	11	519	-	-	-	200,000,000	-	-
		JULY 7/72	5.5		60		0.2	**	**	4,500,000	57,000	5,100
B-8	ROADSIDE DITCH SOUTH SIDE OF CEDAR STREET AT HENDRIE STREET.	JULY 7/72	1.6		20		0.1	**	**	86,000	2,000	910
B-9	MUNICIPAL DRAINAGE DITCH AT STEWART STREET.	JULY 7/72	3.0		110		0.1	**	**	88,000	3,000	2,600
B-10	MUNICIPAL DRAINAGE DITCH AT LILLY STREET.	JULY 7/72	3.0		20		0.1	**	**	10,000	840	710
B-12	MUNICIPAL DRAINAGE DITCH UPSTREAM FROM CONFLUENCE WITH BEETON CREEK.	JULY 19/72	5.0		50		0.1	2.0	.4	50,000	630	1,100
B-13 (NT-60.2)	BEETON CREEK UPSTREAM FROM MUNICIPAL DRAINAGE DITCH.	JULY 19/72	2.5		30		0.1	.85	.11	510	330	40

TABLE III - cont'd

SAMPLING POINT	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS TOTAL (PPM)	SOLIDS SUSP. (PPM)	SOLIDS DISS. (PPM)	MBAS AS LAS	KJELDAHL	PHOSPHORUS AS P TOTAL	BACTERIOLOGICAL EXAMINATION TOTAL COLIFORMS	BACTERIOLOGICAL EXAMINATION FAECAL COLIFORMS	BACTERIOLOGICAL EXAMINATION ENTEROCOCCUS
B-11 (NT-60.0)	BEETON CREEK DOWNSTREAM FROM MUNICIPAL DRAINAGE DITCH AT PATTERSON STREET BRIDGE.	JULY 7/72	2.0	20			0.1	.69	.061	170	140	90
		JULY 19/72	1.6	30			0.1	.80	.11	4,000	390	40
B-15	BEETON CREEK DOWNSTREAM FROM BRIDGE OPPOSITE FARM.	JULY 19/72								2,000	400	160
B-16	BEETON CREEK UPSTREAM FROM LAGOONS.	JULY 19/72								4,200	1,080	440
B-17	BEETON CREEK BETWEEN LAGOON CELLS.	JULY 19/72								6,900	3,800	1,040
B-18	BEETON CREEK DOWNSTREAM FROM LAGOON CELLS.	JULY 19/72	2.0	30			0.1	.75	.085	1,600	900	150
B-19	CELL #1 LAGOON CONTENTS OVERFLOW TO CELL #2.	JULY 19/72	30.0	50			0.2	8.0	3.8	41,000	1,000	< 100

APPENDIX A

WATER QUALITY AND EFFLUENT OBJECTIVES

The OWRC Objectives for surface waters is described in a booklet entitled "Guidelines and Criteria for Water Quality Management in Ontario". A copy of the booklet is enclosed in the pocket on the back cover of this report. This publication contains the guidelines and introduces water quality criteria for various uses including public, agricultural and industrial water supply, recreation, aesthetic enjoyment and the propogation of fish and wildlife. The guidelines should be followed to determine the acceptability of a watercourse for various uses.

A few pertinent maximum limits of contaminants in sewage treatment plants and indus rial effluents are listed below. Adequate protection for surface waters except in certain specific instances influenced by local conditions, should be provided if the following concentrations and pH range are not exceeded.

5-Day BOD - not greater than 15 ppm

Suspended Solids - not greater than 15 ppm

Phenols - not greater than 20 ppb

pH - 5.5 to 10.6

Iron - not greater than 17 ppm

Ether Solubles (oil) - not greater than 15 ppm

GLOSSARY OF TERMS

Bacteriological Examination - The Membrane Filter Technique is used to obtain a direct count of coliform organisms. These organisms are the normal inhabitants of intestines of man and other warm-blooded animals. They are always present in large numbers in untreated sewage and are, in general, relatively few in number in

other stream pollutants.

Biochemical Oxygen Demand (BOD) - The Biochemical Oxygen Demand test indicates the amount of oxygen required for stabilization of the decomposable organic matter found in sewage, sewage effluent, polluted waters, or industrial wastes, by aerobic biochemical action.

Solids - Analyses for solids include tests for total, suspended and dissolved solids. The total solids is a measure of a solid in solution and in suspension. Suspended solids indicates the measure of undissolved solids of organic or inorganic nature whereas the dissolved solids is a measure of those solids in solution.

Oils and Ether Soluble Materials - These include oils and all other soluble materials such as tarry substances and greases. The presence of these pollutants renders water difficult and sometimes impractical to treat either for industrial or domestic use. Oils makes streams unsightly and water unfit for bathing.

Phenolic Compounds - The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed 20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

Alkyl Benzene Sulfonate (ABS)- The Alkyl Benzene Sulfonate portion of the anionic detergents is reported in ppm. The test is generally employed to indicate the presence of domestic wastewater. The popular use of synthetic detergents for general cleaning purposes have resulted in the incidents of residual ABS in streams. As an objective, the ABS concentration should not exceed 0.5 ppm in water used for domestic purposes.

Iron - Water for domestic use should contain less than 0.3 ppm for iron in order to avoid objectionable taste, staining and sediment formation. Iron concentrations of not greater than 17 ppm in waste discharges should permit adequate protection of surface waters.

Nitrogen

Ammonia Nitrogen - or sometimes called free ammonia is the insoluble product in the decomposition of nitrogeneous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rainwater.

The following values may be of general significance in appraising free ammonia content: Low - 0.015 to 0.03 ppm; Moderate - 0.03 to 0.10 ppm; High - 0.10 or greater.

Total Kjeldahl - is a measure of the total nitrogeneous matter present except that measured as nitrite and nitrate nitrogens. The total kjeldahl less the ammonia nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for total kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen - Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the sample, notably the relative magnitude of ammonia and nitrite present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen - Nitrate is the end product of aerobic decomposition of nitrogeneous matter, and its presence carries this significance. Nitrate concentrations is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

Phosphorus

Total Phosphorus - Total Phosphorus is a measure of both the organic and inorganic forms of phosphorus present.

Soluble Phosphorus - Soluble Phosphorus is a measure of the orthophosphate only and when subtracted from the total phosphorus gives an indication of the concentration of organic phosphorus present, that is, the soluble phosphorus is a measure of the inorganic phosphorus present, except the phosphorus in the form of polyphosphate, which however, in surface waters is usually insignificant. Inorganic phosphorus in concentration in excess of 0.01 ppm may cause nuisance conditions.

APPENDIX B

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are:

(1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement,

(2) by requesting the provision of service from a Provincially-owned project, and

(3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with the Commission, the works are provided and developed under Section 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement the Commission utilizes a sinking fund and consequently, the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of 30 years. The annual charges for projects constructed under this agreement are determined as follows:

(1) Capital repayment - as noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital cost is required to retire a debt over a 30-year period.

(2) Interest - on new Commission projects, interest is calculated at the current

rate.

(3) Reserve Fund - to provide money for repairs and replacements, Section 40 of the Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently, earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount 10 times the initial annual billing and the reserve fund billing shall be reimposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

(4) Operating Costs - Under OWRC agreement the municipality is responsible only for the operating cost directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation or maintenance of the project.

PROVINCIALLY-OWNED PROJECTS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new programme allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40-year period.

A slight variation of this programme could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works and develop the water distribution and sewage collector system under the standard type of Commission project. It would

appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works including amortization of capital cost, together with operating and maintenance charges, will be recovered by the sale of service to the affecting municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes the Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a Resolution of the Municipal Council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed works. If a Provincial system is contemplated no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.